Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.-66. (Cancelled)

67. (Currently Amended) A method of obtaining nucleic acid from a sample of heterogeneous biological elements, the method comprising:

(a) providing a sample comprising heterogeneous biological elements, wherein said elements are cells and/or virions;

(b) physically isolating an individual biological element or a subset of the biological elements of the sample within a microfluidic flow channel wherein the isolation step comprises allowing the individual biological element or the subset of the biological elements to flow past a first valve of the microfluidic device, creating a segment within the flow channel by actuating the first valve and a second valve of the microfluidic device, and preventing the individual biological element or the subset of the biological elements from exiting the segment past the first valve or the second valve;

(c) lysing the individual biological element or the subset of biological elements thereby releasing nucleic acids from the biological element(s); and

(d) amplifying at least a portion of the ~~purified~~ nucleic acid,

wherein steps b, c, and d are performed in a microfluidic device.

68. (Cancelled)

69. (Currently Amended) The method of claim 67 wherein only a portion of the ~~entire purified~~ nucleic acid is amplified, wherein said portion comprises ~~to allow reproduction of~~ a gene sequence ~~or gene fragment~~ associated with the individual biological element or subset of biological elements.

70. (Previously Presented) A method of characterizing phylogenetic, gene, and functional diversity exhibited by a specific environment comprising a plurality of biological elements, the method comprising:

(a) providing a sample from the environment comprising heterogeneous biological elements, wherein said elements are cells and/or virions;

(b) physically isolating within a microfluidic flow channel, an individual biological element or a subset of the biological elements of the sample wherein the isolation step comprises allowing the individual biological element or the subset of the biological elements to flow past a first valve of the microfluidic device, creating a segment within the flow channel by actuating the first valve and a second valve of the microfluidic device, and preventing the individual biological element or the subset of the biological elements from exiting the segment past the first valve or the second valve;

(c) lysing the individual biological element or the subset of biological elements thereby releasing nucleic acids from the biological element(s); and

(d) amplifying at least a portion of the ~~purified~~ nucleic acid,

wherein steps b, c, and d are performed in a microfluidic device.

(e) identifying at least one of phylogenetic, gene, and functional diversity of the amplified portion of the purified nucleic acid,

wherein steps b, c, and d are performed in a microfluidic device.

71. (Original) The method of claim 70 wherein genetic diversity is identified by sequence analysis.

72. (Currently Amended) The method of claim 70 further comprising:

observing morphology of the physically isolated individual biological element or subset of biological elements prior to lysis; and

correlating the genetic diversity with the observed morphology.

73. (Currently Amended) A method of obtaining genetic information regarding an individual biological element of a complex environmental sample, the method comprising:

(a) providing an environmental sample comprising heterogeneous biological elements, wherein said elements are cells and/or virions;

(b) physically isolating within a microfluidic flow channel, an individual biological element or a subset of the biological elements of the sample wherein the isolation step comprises allowing the individual biological element or the subset of the biological elements to flow past a first valve of the microfluidic device, creating a segment within the flow channel by actuating the first valve and a second valve of the microfluidic device, and preventing the individual biological element or the subset of the biological elements from exiting the segment past the first valve or the second valve;

(c) lysing the individual biological element or the subset of biological elements to expose nucleic acid present therein;

(d) amplifying at least a portion of the ~~purified~~ nucleic acid,

(e) identifying genetic information represented by the amplified ~~and purified~~ nucleic acid

wherein steps b, c, and d are performed in a microfluidic device.

74. (Cancelled).

75. (Original) The method of claim 73 further comprising:

transforming a cell with the amplified portion of the purified nucleic acid ligated into an appropriate vector; and

culturing the transformed cell to clone the amplified sequence.

76. (Previously Presented) The method according to claim 67 wherein lysing is performed by a lysing chemical introduced through a cross-flow injector structure, wherein the cross-flow injector structure comprises the intersection of a first microfluidic flow channel and a second microfluidic flow channel.

77. (Previously Presented) The method according to claim 67 wherein the individual biological element or the subset of biological elements is isolated within the microfluidic channel through the activation of a deflectable membrane.

78. (Previously Presented) The method according to claim 67 wherein the deflectable membrane is activated by a control line.

79. (Previously Presented) The method according to claim 67 wherein lysing is performed in a rotary mixer of the microfluidic device.

80. (Previously Presented) The method according to claim 70 wherein lysing is performed by a lysing chemical introduced through a cross-flow injector structure, wherein the cross-flow injector structure comprises the intersection of a first microfluidic flow channel and a second microfluidic flow channel.

81. (Previously Presented) The method according to claim 70 wherein the individual biological element or the subset of biological elements is isolated within the microfluidic channel through the activation of a deflectable membrane.

82. (Previously Presented) The method according to claim 70 wherein the deflectable membrane is activated by a control line.

83. (Previously Presented) The method according to claim 70 wherein lysing is performed in a rotary mixer of the microfluidic device.

84. (Previously Presented) The method according to claim 73 wherein lysing is performed by a lysing chemical introduced through a cross-flow injector structure, wherein the cross-flow injector structure comprises the intersection of a first microfluidic flow channel and a second microfluidic flow channel.

85. (Previously Presented) The method according to claim 73 wherein the individual biological element or the subset of biological elements is isolated within the microfluidic channel through the activation of a deflectable membrane.

86. (Previously Presented) The method according to claim 73 wherein the deflectable membrane is activated by a control line.

87. (Previously Presented) The method according to claim 73 wherein lysing is performed in a rotary mixer of the microfluidic device.